

EQUIPMENT GUARDING O

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437-004-1910 General Equipment Guarding.

(1) Scope – These are general requirements that apply to all equipment.

(2) Definitions.

Ground driven components – Components powered by the turning motion of a wheel as the equipment travels over the ground.

Guard or shield – A barrier to protect against contact with a moving machine part.

Point of operation – The area of a machine that contacts the work material.

Power take-off shafts – Shafts and universal joints between the tractor, or other power source, and the first gear set, pulley, sprocket, or other components on power take-off shaft driven equipment.

(3) Operating instructions.

(a) Instruct every employee on their initial assignment about the safe operation and servicing of all equipment they will use. Renew this instruction at least annually. Include at least these safe practices:

(A) Keep all guards in place when the machine is in use;

(B) Permit no riders on farm field equipment other than persons required for instruction or assistance;

(C) Stop engine, disconnect the power source and wait for all machine movement to stop before servicing, adjusting, cleaning, or unclogging the equipment. Instruct employees in the safe procedures necessary to service or maintain the equipment when it must remain running;

(D) Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine;

(E) Refer to and comply with 4/J, OAR 437-004-1275, Lockout/Tagout.

(4) Methods of guarding.

(a) Except as otherwise stated, prevent contact with moving machinery parts as follows:

(A) By a guard or shield or guarding by location;

(B) When a guard or shield or guarding by location is infeasible, use a guardrail or fence.

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(5) Strength and design of guards.

(a) Design and place guards to protect against inadvertent contact with the hazard.

NOTE: Minimum requirements for guards are in Table 1.

Table 1

Material	Clearance From Moving Parts at all Points (inches)	Largest Mesh or Opening Allowable (inches)	Minimum Gauge (U.S. Standard) or Thickness
Woven Wire	Under 2	3/8	No. 16 Gauge
	2-4	1/2	No. 16 Gauge
	4-15	2	No. 12 Gauge
Expanded Metal	Under 4	1/2	No. 18 Gauge
	4-15	2	No. 13 Gauge
Perforated Metal	Under 4	1/2	No. 20 Gauge
	4-15	2	No. 14 Gauge
Sheet Metal	Under 15		No. 22 Gauge
Plastic	Under 15		Tensile strength of 10,000 lb/in (2)

(b) Unless otherwise specified, each guard and its supports must be able to withstand the force applied to it.

(c) Guards must be free from burrs, sharp edges, and sharp corners. Secure guards to the equipment or building.

(6) Guarding by location. A component is guarded by location during operation, maintenance, or servicing when, because of its location, no employee can inadvertently come in contact with the hazard.

(7) Guarding by railings. Use guardrails or fences to protect employees from inadvertently entering the hazardous area.

(8) Servicing and maintenance. When a moving machinery part presents a hazard during servicing or maintenance, stop the engine, disconnect the power source, and wait for all machine movement to stop before proceeding, except where the employer can establish that:

(a) the equipment must be running for proper service or maintenance; and

(b) service or maintenance is not possible while a guard or guards required by these rules are in place.

(9) Miscellaneous general requirements. Cover or install a guard on machines that throw stock, material, or objects. (Such machines as rip saws, rotary mowers and beaters, rotary tillers are a few in this classification.)

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(10) Machine controls.

- (a) A power control switch to stop the machine or machine feed must be within reach of the operator without leaving their normal operating position.
- (b) Mark the power control switch to indicate its function and the machine that it controls. Indicate the positions of ON and OFF.
- (c) On fixed machines, use red or orange to mark "Stop" buttons. Each machine must have one or more stop buttons at or near to the working position of the operator(s).
- (d) Locate and guard the machine control switch to prevent its unexpected or accidental movement. Recess electrical switch "Start" buttons.

(11) Anchoring fixed machinery. Securely anchor machines designed for a fixed location to prevent walking or moving.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 4-1998, f/8/28/98, ef. 10/1/98.

437-004-1940 Farm Field Equipment.

(1) Application.

Rule 437-004-1940 applies to all farm field equipment except that the parts below do not apply to equipment manufactured before October 25, 1976:

1940(4)

1940(5)

1940(6)(b)(A)

(2) Definition.

Farm field equipment – Tractors or implements, including self-propelled implements, or any combination.

(3) Power take-off guarding.

- (a) Guard all power take-off shafts with a master shield or by other protective guarding.
- (b) Tractors must have a master shield or guard strong enough to support the operator if they get on or off the tractor using the shield as a step.
- (c) Guard equipment driven by a power take-off to protect against employee contact with rotating parts of the power drive system. Where power take-off driven equipment requires removal of the tractor master shield, ensure the equipment includes protection from that portion of the tractor power take-off shaft that protrudes from the tractor.

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(d) There must be signs on tractors and power take-off driven equipment to remind operators to keep safety shields in place.

(4) Other power transmission components.

(a) Guard the mesh or nip points of all power driven gears, belts, chains, sheaves, pulleys, sprockets, and idlers by protective shield, location, guardrail or fence.

(b) Guard all revolving shafts, including projections such as bolts, keys, or set screws, by protective shield, location, or guardrail or fence.

(c) Exceptions to the guarding requirements are as follows:

(A) Smooth off shafts and shaft ends (without any projecting bolts, keys, or set screws), revolving at less than 10 rpm, on feed handling equipment used on the top surface of materials in bulk storage facilities; and

(B) Smooth off shaft ends protruding less than one-half the outside diameter of the shaft and its locking means.

(5) **Functional components.** Guard as much as possible, all moving parts that must be exposed to operate. Ensure the guard does not interfere with the normal operation of the equipment. Examples of these components are snapping or husking rolls, straw spreaders and choppers, cutterbars, flail rotors, rotary beaters, mixing augers, feed rolls, conveying augers, rotary tillers, and similar units.

(6) Access to moving parts.

(a) Ensure that guards, shields, and access doors are in place when equipment is running.

(b) Where removal of a guard or access door will expose an employee to any component that continues to rotate after the power is disengaged, provide the following:

(A) A readily visible or audible warning of rotation; and

(B) A safety sign warning the employee to:

(i) Look and listen for evidence of rotation; and

(ii) Not remove the guard or access door until all components stop.

(7) Electrical disconnect means.

(a) Prevent application of electrical power from a location not under the immediate and exclusive control of the employee or employees maintaining or servicing equipment by:

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- (A) Providing an exclusive, positive locking means on the main or ignition switch which can be operated only by the employee or employees performing the maintenance and servicing; or
 - (B) In the case of material handling equipment in a bulk storage structure, by physically locating on the equipment an electrical or mechanical means to disconnect the power.
- (b) Ensure all circuit protection devices, including those that are an integral part of a motor, are of the manual reset type.
- (c) Exceptions to (b) above are where:
- (A) The employer can establish that because of the nature of the operation, distances involved and the amount of time normally spent by employees in the area of the affected equipment, use of the manual reset device would be infeasible;
 - (B) There is an electrical disconnect switch available to the employee within 15 feet of the equipment being maintained or serviced; and
 - (C) There is a sign near each hazardous part warning the employee that unless they use the electrical disconnect switch, the motor could automatically reset while the employee is working on the hazardous component.

(8) Additional requirements.

- (a) Use a clutch or other effective means for stopping powered machines not driven by an individual motor.
- (b) Ensure sufficient clearance for all friction clutches and keep them adjusted to prevent any drag or creeping when disengaged.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 4-1998, 1/8/28/98, ef. 10/1/98.

437-004-1970 Farmstead Equipment.

(1) Application.

Rule 437-004-1970 applies to all farmstead equipment except that the parts below do not apply to equipment manufactured before October 25, 1976:

1970(4)

1970(5)

1970(6)(b)(A)

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(2) Definition.

Farmstead equipment – Equipment that is normally stationary. This includes, but is not limited to, material handling equipment and accessories for this equipment whether or not it is an integral part of a building.

(3) Power take-off guarding.

(a) Guard all power take-off shafts with either a master shield or by other protective guarding.

(b) Guard power take-off driven equipment to prevent contact with positively driven rotating parts of the power drive system. If power take-off driven equipment requires removal of the tractor master shield, ensure that the equipment includes protection from that part of the tractor power take-off shaft that protrudes from the tractor.

(c) There must be signs on power take-off driven equipment to remind operators to keep safety shields in place.

(4) Other power transmission components.

(a) Guard the mesh or nip points of all power driven gears, belts, chains, sheaves, pulleys, sprockets, and idlers by protective shield, location, guardrail or fence.

(b) Guard all revolving shafts, including projections such as bolts, keys, or set screws, by protective shield, location, or guardrail or fence.

(c) Exceptions to the guarding requirements are as follows:

(A) Smooth off shafts and shaft ends (without any projecting bolts, keys, or set screws), revolving at less than 10 rpm, on feed handling equipment used on the top surface of materials in bulk storage facilities; and

(B) Smooth off shaft ends protruding less than one-half the outside diameter of the shaft and its locking means.

(5) Functional components.

(a) Guard to the fullest extent all functional components that must be exposed to operate. The guard must not substantially interfere with the normal operation of the equipment. Examples of these components are choppers, rotary beaters, mixing augers, feed rolls, conveying augers, grain spreaders, stirring augers, sweep augers, and feed augers.

(b) Guard sweep arm material gathering mechanisms on the top surface of materials within silo structures. Locate the lower or leading edge of the guard no more than 12 inches above the material surface and no less than 6 inches in front of the leading edge of the rotating member of the gathering mechanism. Ensure the guard is parallel to and extends the fullest practical length of the material gathering mechanism.

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(c) Paragraph (b) above does not apply to bulk grain storage bins and similar structures where no workers are present except for installation or removal of the sweep arm material gathering mechanisms. During such work, disconnect and lockout the electrical power source following the procedures in OAR 437-004-1275, Division 4/J, Lockout/Tagout.

(d) Guard exposed auger flighting on portable augers with either grating type guards or solid baffle style covers as follows:

(A) Ensure the largest dimensions or openings in grating type guards through which materials must flow are 4 3/4 inches. Ensure the area of each opening is no larger than 10 square inches. Locate the opening no closer to the rotating flighting than 2 1/2 inches.

(B) Ensure slotted openings in solid baffle style covers are not wider than 1 1/2 inches, or closer than 3 1/2 inches to the exposed flighting.

(C) Openings larger than those in (A) and (B) above are allowable if necessary to permit the free flow of material that has a tendency to bridge over. Ensure these openings are no larger than required for proper functioning of the auger. Design, arrange or locate the guard so that no part of an employee's body may contact the auger flighting.

(6) Access to moving parts.

(a) Ensure that guards, shields, and access doors are in place when the equipment is in operation.

(b) Where removal of a guard or access door will expose an employee to any component that continues to move after the power is disengaged, provide the following:

(A) A readily visible or audible warning of rotation; and

(B) A safety sign warning the employee to:

(i) Look and listen for evidence of rotation; and

(ii) Not remove the guard or access door until all parts stop.

(c) There must be a guard with openings no larger than 1/2-inch when the blades of a fan are less than 7 feet above the floor or working level.

(7) Additional guarding requirements.

(a) Properly safeguard carton or bag stitching machines to prevent employees from contacting the stitching head and other pinch or nip points.

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(b) Guard the point of operation of all machines. Design and construct the guard to prevent any part of the operator's body from being in the danger zone during the operating cycle.

NOTE: Table 2 gives the distances that point-of-operation guards must be from the guarding line in relation to the size of the opening.

Guarding Line or Distance of Opening from Point of Operation Hazard (inches)	Maximum Width of Opening (inches)
1/2 to 1 1/2	1/4
1 1/2 to 2 1/2	3/8
2 1/2 to 3 1/2	1/2
3 1/2 to 5 1/2	5/8
5 1/2 to 6 1/2	3/4
6 1/2 to 7 1/2	7/8
7 1/2 to 12 1/2	1 1/4
12 1/2 to 15 1/2	1 1/2
15 1/2 to 17 1/2	1 7/8
17 1/2 to 31 1/2	2 1/8

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 4-1998, f/8/28/98, ef. 10/1/98.

437-004-2000 Powered Saws.

(1) **Scope** – This applies to nonportable powered saws.

(2) General.

- (a) Machines must not vibrate when the tool is run at full speed.
- (b) Arbors and mandrels must have firm and secure bearing and be free from play.
- (c) Do not use any automatic cutoff saw that strokes continuously without operator control of each stroke.
- (d) Saw frames and tables must have lugs cast on the frame or an equivalent way to limit the size of the saw blade to avoid overspeed.
- (e) Circular saw fences must attach to the table or table assembly without changing their alignment with the saw. The fences for tilting tables or tilting arbors must remain parallel with the saw regardless of the angle of the saw with the table.
- (f) Circular saw gages must slide in accurately machined grooves or tracks to insure exact alignment with the saw for all positions of the guide.
- (g) Hinged saw tables must be lockable in any position and in alignment with the saw.

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(h) Guard all belts, pulleys, gears, shafts, and moving parts to comply with OAR 437-004-1970, Division 4/O.

(i) Electrically ground all equipment to comply with OAR 437-004-2810, Division 4/S.

(j) A guard must cover the rear portion of the saw beneath or behind the table when exposed to contact. An exhaust hood may serve this purpose if appropriate.

(k) Do not mount any saw, cutter head or tool collar on a machine not made to work with them.

(l) There must be combs (featherboards) or suitable jigs to use when a standard guard cannot be used, like for dadoing, grooving, jointing, moulding, and rabbeting.

(3) Machine controls and equipment.

(a) There must be a mechanical or electrical power control switch so the operator does not have to leave the point of operation to shut off the machine.

(b) Use a locking-type belt shifter or other positive device on machines driven by belts and shafting.

(c) Provide a positive method to prevent a machine from automatically restarting after a power failure.

(d) Locate power and operating controls within reach of the operator. Do not allow the operator to reach over the cutter head to make adjustments. This does not apply to constant pressure controls used only for setup.

(e) Provide a positive means to make electric motor driven machine controls and devices inoperable during repairs or adjustments.

(f) Protect foot-operated controls from unexpected or accidental activation.

(g) Cover feed rolls, of feeder attachments, to protect the operator from contacting hazardous parts.

(4) Band saws.

(a) Completely enclose band wheels. Construct guards of at least No. 14 U.S. gauge metal, nominal 2-inch wood material, or mesh or perforated metal of not less than U.S. gauge No. 20 with 3/8-inch or smaller openings.

(b) Enclose all portions of the band saw blade except the working side of the blade between the guide and the table.

(5) Radial arm saws.

- (a) Radial arm saws must have a hood that completely encloses the upper portion of the blade down to a point that includes the end of the saw arbor.
- (b) The saw blade must not extend beyond the front edge of the table or roll case.
- (c) A lower blade guard must guard the lower part of the blade and stay in contact with the material during the entire cut.
- (d) When ripping, radial arm saws must have anti-kickback fingers on each side of the saw.
- (e) Mark the direction of saw rotation on the hood.
- (f) Attach a permanent warning sign prohibiting rip or plough cuts from the rear of the guard. Rip and plough only against the direction of blade rotation.
- (g) Blades or cutting heads on radial arm saws must automatically return gently and stay at the back of the table.

NOTE: Use a counterweight or other effective means, a retractor device, or tilt the arm sufficiently to keep the saw at the back when released by the operator.

(6) Table saws.

- (a) Circular crosscut table saws must have a hood that covers the saw at least to the depth of the teeth.
- (b) The hood must automatically adjust itself to the thickness of and remain in contact with, the material being cut. When the guard may mar the surfaces of material, it may be raised slightly to avoid contact.
- (c) The hood must protect the operator from flying splinters and broken saw teeth.
- (d) Fully guard rip table saws, and combination rip and crosscut table saws as required in **OAR 437-004-2000(4)(a)** and **(b)**. They must have a spreader and anti-kickback fingers. The spreader is not necessary when rabbeting, ploughing, grooving or for cutting dados.
- (e) Fully guard the part of the table saw beneath the table.
- (f) Use push sticks to guide short stock and ends through table saws without self-feeding devices.

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(7) Wobble saws. Do not insert wedges between a saw disk and its collar to form a “wobble saw” for rabbeting.

NOTE: This rule does not apply to properly designed and adjustable rabbeting blades.

(8) Cracks in blades. Do not use a circular saw blade with a crack greater in length than those in the following table:

Length of crack	Diameter of saw in inches
1/2-inch	12 inches
1-inch	24 inches
1 1/2-inch	36 inches

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 4-1998, f/8/28/98, ef. 10/1/98.
OR-OSHA Admin. Order 9-2006, f. 9/22/06, ef. 9/22/06.

437-004-2100 Grinders.

(1) Scope – These rules apply to all grinders except:

Standards for portable, hand-held power-driven grinders are in OAR 437-004-2230, Division 4/P.

Natural sandstone wheels.

Metal, wooden, cloth or paper wheels or discs with a layer or layers of abrasive on the surface.

(2) Definitions.

Abrasive wheel – cutting device made of abrasive grains held together by organic or inorganic bonds, including diamond and reinforced wheels.

Off-hand grinding – The grinding of anything held in the operator’s hand.

Portable grinding – A grinding operation where the grinding machine is hand held and easily moved from one place to another.

Safety guard – An enclosure for an abrasive wheel. It has a peripheral and two side members. Its purpose and design is to contain the pieces of the wheel if the wheel breaks while in use.

(3) Use.

(a) Mount grinders securely on the floor, bench, foundation or other structure.

(b) Do not use grinders that vibrate or are out-of-balance.

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(c) Do not use abrasive wheels that are out-of-round or out-of-balance.

(d) Off-hand grinding machines must have work rests that are:

(A) Rigid and adjustable to compensate for wheel wear.

(B) Kept adjusted to within 1/8-inch of the wheel to prevent work from jamming between the wheel and the rest.

(C) Securely tightened after each adjustment.

(e) Do not adjust a moving wheel.

(f) Do side grinding only on wheels designed for that purpose.

NOTE: Dressing on the side of straight wheels is acceptable only with very light pressure.

(4) Mounting.

(a) Assure that grinding wheels fit freely but not loosely on the spindle and remain free under all grinding conditions.

(b) Do not operate an abrasive wheel designed to be held by flanges unless it is properly mounted between suitable flanges. Flanges must be at least one-third the diameter of the wheel, except for those types requiring flanges of a special design.

(c) Install blotters (compressible washers) between flanges and abrasive wheel surfaces to insure uniform distribution of flange pressure.

(d) Properly position the safety guard after mounting a wheel.

(e) Run the grinder at operating speed after mounting an abrasive wheel with the safety guard in place or in a protected enclosure for at least one minute before using it. Keep employees away from the front of the wheel during this time.

(f) Do not use wheels larger than those recommended by the manufacturer.

(5) Safety guards.

(a) Use abrasive wheels larger than 2 inches in diameter only on machines with safety guards.

(b) These do not require safety guards:

(A) Specially-shaped abrasive wheels mounted in a mandrel-type bench or floor stand and used for and commonly known as "sickle grinding stones or wheels."

(B) Abrasive wheels where the work itself provides full protection but only while the wheel is within the area of protection.

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NOTE: Abrasive wheel safety guards must meet the design specifications of the American National Standard Code for the Use, Care, and Protection of Abrasive Wheels (ANSI B7.1-1988).

(c) Abrasive wheels must have guards that cover the spindle end, nut, and outer flange projection of the wheel. Guard the sides and periphery of the wheel except for that degree of exposure permitted below.

(A) Bench and floor stands.

(i) The maximum permissible angle of exposure is 90 degrees. Begin this exposure at a point not more than 65 degrees above the horizontal plane of the wheel spindle.

(ii) Do not exceed 125 degrees exposure where the nature of the work requires contact with the wheel below the horizontal plane of the spindle. Begin this exposure at a point not more than 65 degrees above the horizontal plane of the wheel spindle.

(B) Swing frame grinders. The maximum permissible angle of exposure is 180 degrees. Enclose the top half of the wheel.

(C) Top grinding. Do not exceed 60 degrees exposure of the grinding wheel periphery where the work contacts the top of the wheel.

(d) The peripheral protecting part of safety guards must adjust to compensate for wheel wear when the operator stands in front of the opening.

(e) Maintain 1/4-inch between the wheel periphery and the adjustable tongue or the guard above the wheel.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 4-1998, 1/8/28/98, ef. 10/1/98.

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